Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-5.   (Canceled)

6.   (Currently amended) A data processing system for profiling an application in the [[a]] data processing system, the data processing system comprising:

each one of a plurality of individual instructions associated with an indicator that indicates that each one of the plurality of instructions needs to be monitored, the indicator stored in at least one existing spare bit in each one of the plurality of individual instructions;

an instruction cache, which is included in a processor, for using said indicator to detect execution of each one of the plurality of instructions, wherein execution of instructions, which are not associated with the indicator, is not detected;

the instruction cache ~~detecting means~~ for detecting execution of a particular one of the plurality of instructions using the indicator that is stored in the at least one existing spare bit in the particular one of the plurality of instructions ~~an instruction associated with an indicator~~, wherein the instruction is located in a routine;

the instruction cache ~~determining means~~ for determining whether the particular one of the plurality of instructions ~~instruction~~ has been executed more often than a threshold value; and

the instruction cache ~~generating means~~, responsive to the particular one of the plurality of instructions ~~instruction~~ having been executed more often than the threshold value, for generating an interrupt to pass control to a monitoring program, wherein the monitoring program identifies information regarding a caller of the [[a]] routine.

7.   (Original) The data processing system of claim 6 further comprising:

examining means for examining a call stack upon generation of the interrupt; and

identifying means for identifying a caller of the routine from an examination of the call stack.

8.   (Original) The data processing system of claim 6, wherein the information includes at least one of a caller of the routine and a number of instructions executed in the routine.

9.   (Currently amended) The data processing system of claim 6, ~~wherein the generating means is a first generating means and~~ further comprising:

        ~~second~~ generating means for generating a call graph from the information.

10.   (Original) The data processing system of claim 6 further comprising:

        selecting means for selecting the caller of the routine for analysis based on the information gathered by the monitoring program.

11.   (Currently amended) A computer program product, which is stored in a computer readable medium, for profiling an application in a data processing system, the computer program product comprising:

        first instructions for associating each one of a plurality of individual instructions with an indicator that indicates that each one of the plurality of instructions needs to be monitored;

        second instructions for storing said indicator in at least one existing spare bit in each one of the plurality of individual instructions;

        said indicator used to detect execution of each one of the plurality of instructions, wherein execution of instructions, which are not associated with the indicator, is not detected;

        third [[first]] instructions for detecting, by an instruction cache, execution of a particular one of the plurality of instructions using the indicator that is stored in the at least one existing spare bit in the particular one of the plurality of instructions ~~an instruction associated with an indicator~~, wherein the instruction is located in a routine;

        fourth ~~second~~ instructions for determining, by the instruction cache, whether the particular one of the plurality of instructions ~~instruction~~ has been executed more often than a threshold value; and

        fifth [[third]] instructions, responsive to the particular one of the plurality of instructions ~~instruction~~ having been executed more often than the threshold value, for generating, by the instruction cache, an interrupt to pass control to a monitoring program, wherein the monitoring program identifies information regarding the [[a]] caller of a routine.

12.   (Currently amended) The computer program product of claim 11 further comprising:

        sixth ~~fourth~~ instructions for examining a call stack upon generation of the interrupt; and

        seventh [[fifth]] instructions for identifying a caller of the routine from an examination of the call stack.

13.   (Original) The computer program product of claim 11, wherein the information includes at least one of a caller of the routine and a number of instructions executed in the routine.

14.   (Currently amended) The computer program product of claim 11 further comprising:
        sixth ~~fourth~~ instructions for generating a call graph from the information.

15.   (Currently amended) The computer program product of claim 11 further comprising:
        sixth ~~fourth~~ instructions for selecting the caller of the routine for analysis based on the information gathered by the monitoring program.

16.   (New) The data processing system according to claim 6, further comprising:
        the indicator stored in a plurality of existing spare bits in each one of the plurality of instructions;
        a first one of the plurality of bits indicating that each execution of each one of the plurality of instructions should be counted;
        a second one of the plurality of bits identifying the threshold value; and
        a third one of the plurality of bits used as a counter to count a number of times each one of the plurality of instructions is executed.

17.   (New) The data processing system according to claim 16, further comprising:
        a set of registers for controlling a meaning of each one of the plurality of bits.

18.   (New) The computer program product according to claim 11, further comprising:
        the second instructions for storing the indicator in a plurality of existing spare bits in each one of the plurality of instructions;
        a first one of the plurality of bits indicating that each execution of each one of the plurality of instructions should be counted;
        a second one of the plurality of bits identifying the threshold value; and
        a third one of the plurality of bits used as a counter to count a number of times each one of the plurality of instructions is executed.

19.   (New) A computer program product, which is stored in a computer readable medium, for profiling an application in a data processing system, the computer program product comprising:
        first instructions for associating each one of a plurality of individual instructions with an indicator that indicates that each one of the plurality of individual instructions needs to be monitored;

second instructions for storing the indicator in a plurality of existing spare bits in each one of the plurality of individual instructions;

said indicator used to detect execution of each one of the plurality of instructions, wherein execution of instructions, which are not associated with the indicator, is not detected;

third instructions for detecting, by an instruction cache, execution of a particular one of the plurality of instructions using the indicator that is stored in the plurality of existing spare bits in the particular one of the plurality of instructions, wherein the particular one of the plurality of instructions is located in a routine;

fourth instructions for sending, by the instruction cache, a signal to a performance monitor unit in response to detecting execution of said particular one of the plurality of instructions;

fifth instructions for determining, by the instruction cache, whether the particular one of the plurality of instructions has been executed more often than a threshold value, the threshold value being a number of clock cycles that are needed to complete the particular one of the plurality of instructions;

sixth instructions responsive to the particular one of the plurality of instructions having been executed more often than the threshold value: for generating, by the instruction cache, an interrupt to pass control to a monitoring program, wherein the monitoring program identifies information regarding a caller of the routine.

seventh instructions for examining a call stack upon generation of the interrupt;

eighth instructions for identifying a caller of the routine from an examination of the call stack;

wherein the information includes the caller of the routine and a number of instructions executed in the routine;

instructions for generating a call graph from the information;

instructions for selecting the caller of the routine for analysis based on the information gathered by the monitoring program;

a first one of the plurality of bits indicating that each execution of each one of the plurality of instructions should be counted;

a second one of the plurality of bits identifying the threshold value;

a third one of the plurality of bits used as a counter to count a number of times each one of the plurality of instructions is executed; and

instructions for controlling, by a set of registers, a meaning of each one of the plurality of bits.